

Comparative Analysis of Suction Vs Forceps Band Ligation in Hemorrhoids

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ABSTRACT

Objective: To compare outcome of suction versus forceps band ligation for management of low grade hemorrhoids.

Study Design: Quasi-experimental study

Place and Duration of Study: Department of Surgery, Combined Military Hospital Multan, Pakistan from Jan 2023 to Jan 2024".

Methodology: The quasi-experimental study included one hundred patients who were divided into two groups based on the intervention they underwent either suction or forceps rubber band ligation for second degree hemorrhoids. Patients were assessed in terms of intra-operative and post-operative outcomes including pain, recurrence and leave from work and results were compared between study groups. Data was analyzed by SPSS 22.

Results: Median age of the patients was 32.00 (65.00 - 18.00) years. There were 64(64.00%) male and 36(36.00%) female patients. Median body mass index (BMI) was 27.83 (46.00 - 21.13) kg/m². Median intra-operative pain visual analogue scale (VAS) score in suction band ligation group was 3.00 (5.00 - 2.00) while in forceps band ligation group, it was 6.00 (7.00 - 4.00), ($p < 0.001$). Median twenty four hours post-operative pain VAS in suction band ligation group was 2.00 (3.00 - 1.00) while in forceps band ligation group, it was 4.00 (5.00 - 2.00), ($p < 0.001$). No significant difference was observed between groups in terms of frequency of patients who were on leave from work by day four ($p=0.552$). None of the patients in both groups had recurrence of hemorrhoids at one month follow up.

Conclusion: This study concluded that the Suction band ligation significantly reduces the intra-operative and post-operative pain as compared to forceps band ligation.

Keywords: Hemorrhoids, Outcome, Rubber band ligation, Visual analog scale.

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INTRODUCTION

Hemorrhoids result from the pathological enlargement and distal displacement of the anal cushions which are vascular structures crucial for maintaining anal continence.¹ These are located in a close proximity to the dentate line of the anal canal and are composed of muscular, connective and vascular tissue.² These are amongst the most common cases encountered in the surgical outdoor departments and majority of these cases present with the complaint of bleeding of fresh red blood, mostly without any associated pain, through the anus.³ In Pakistan, according to a recent survey, prevalence of hemorrhoids have been reported to be at 47.9%.⁴

Recent research have shown that the etiology of hemorrhoids is multifactorial and is influenced by the genetic predisposition, venous insufficiency and increased intra-abdominal pressure which may occur secondary chronic constipation, habit of sitting and

straining for prolonged periods of time while defecating and going through the pregnancy.⁵ Management of hemorrhoids depends upon the symptomatology and the severity of the disease with which the patient presents and choices include infrared coagulation (IRC), sclerotherapy (SCL), rubber band ligation (RBL), Doppler hemorrhoidal artery ligation (DGHAL), stapled hemorrhoidectomy and surgical hemorrhoidectomy.⁶

It is a consensus that for lower grades of hemorrhoids i.e., grade 1 and 2, band ligation should be a preferred modality of treatment instead of invasive approaches.⁶ In addition, the efficacy of RBL is also well established by a large number of studies, as compared to other minimally invasive options.^{7,8} While performing RBL, there are two distinct options for ligation that have been hypothesized to impact the severity of post-operative pain including "Forceps ligation" and "Suction ligation."⁹ However, when it comes to comparison of these two options to perform ligation, comparative studies are generally lacking which makes it highly imperative to conduct further studies in this regard. For this purpose, this study

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aimed to compare the outcome of Suction versus Forceps band ligation for the management of low grade hemorrhoids.

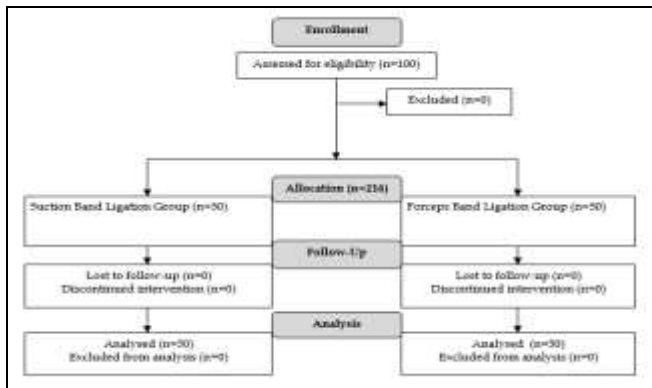


Figure: Patient Flow Diagram

METHODOLOGY

This quasi-experimental study was conducted from January 2023 to January 2024 at Surgical department of Combined Military Hospital Multan, Pakistan after taking ethical committee approval (ERB # 13/Trg/ERC No. 54/2024 dated 2nd Jan 2023) of the institution. For the calculation of appropriate sample size, Open Epi sample size calculator software was used using following formula:

$$n = \frac{2\sigma^2(z_{1-\alpha/2} + z_{1-\beta})^2}{(\mu_1 - \mu_2)^2}$$

Sample size was calculated by taking 5% level of significance, 95% power, anticipated mean pain score in Suction band ligation Group of 1.92 ± 1.93 10 and anticipated mean pain score in Forceps band ligation Group of 4.00 ± 2.09. 10 Calculated sample size was 50 selected through non-probability purposive sampling. However, sample size was increased for better outcomes. A total of 100 patients with 50 patients in each group were included in the study.

Inclusion Criteria: Male and female patients age 18 years or above, who had symptomatic second degree hemorrhoids as per Goligher classification 11 were made part of this study.

Exclusion Criteria: Individuals having history of any chronic disease (like diabetes, hypertension, chronic liver disease or chronic kidney disease), those having first, third or fourth degree hemorrhoids, patients having history of platelet or coagulation disorders and those who had ongoing rectal malignancy were excluded.

Written consent forms were signed by all the patients undergoing surgery as per institutional protocol. Baseline characteristics including age, gender and body mass index (BMI) were documented. After this patients were divided into two groups based on their medical registration number. Patients having their MR number ending at an odd number were placed in “Suction band ligation” Group. In this group, band ligation was performed by using a proctoscope with pre-installed light and a “LEM-disposable suction apparatus” which was connected to “Nouvag TM suction pump set”. Hemorrhoid pedicles were sucked into band ligation barrel and the columns were ligated. Patients having their MR number ending at an even number were placed in “Forceps band ligation” Group. In this group, band ligation was performed by using a conventional proctoscope, hemorrhoids pedicles were picked and pulled down by using the stainless steel Allis forceps till dentate line into the band ligation barrel and the columns were ligated.

All the procedures were performed by a team of two surgeons under local anesthesia, each having a minimal experience of five years. During the procedure, once ligation is performed, patients were asked regarding the severity of the pain. After band ligation, all patients were given syrup lactulose (Duphalac ®) 15 ml every twelve hours for 5 days, tablet Paracetamol 1g eight hourly for 5 days and tablet Ciprofloxacin 500mg twice daily for 5 days. Dietary modifications like increase intake of water, use of fresh fruits and vegetables and high fiber diet were advised after the procedure. Patients were visited again in the ward at completion of twenty four hours of surgery to assess for post-operative pain visual analogue scale (VAS) score. At first follow up on day 4, patients were asked regarding their return to work and the status was documented. At one month follow up, patients were assessed for recurrence of hemorrhoids.

Data was analyzed by using Statistical Package for Social Sciences (SPSS) 22.00. Quantitative variables (age, BMI and pain VAS) were represented using median (IQR). Qualitative variables (gender) were represented by using percentage and frequency. To compare pain VAS between groups, Mann Whittney U-test was used while to compare frequency of patients who were on leave from work on day 4 after procedure and recurrence after one month between

Analysis of Suction Vs Forceps Band Ligation

groups, chi-square test was used. A p -value of ≤ 0.05 was taken as statistically significant.

DISCUSSION

The present study demonstrates that Suction

Table-I: Comparison of baseline characteristics among study groups (n = 100)

Characteristic(s)		Suction Band Ligation Group (n = 50)	Forceps Band Ligation Group (n = 50)	p-value
Age(Years)	Median (IQR)	39.00 (65.00 - 18.00) years	30.00 (56.00 - 18.00) years	0.107
Gender	n(%)			
Male		32(64.00%)	32(64.00%)	1.000
Female		18(36.00%)	18(36.00%)	
Body Mass Index (kg/m ²)	Median (IQR)	29.00 (46.00 - 21.21) kg/m ²	27.00 (46.00 - 21.13) kg/m ²	0.534

Table-II: Comparison of Median Intra-Operative Pain VAS Score Between Study Groups (n = 100)

Characteristic		Suction Band Ligation Group (n = 50)	Forceps Band Ligation Group (n = 50)	p-value
Intra-operative pain VAS score	Median (IQR)	3.00 (5.00 - 2.00)	6.00 (7.00 - 4.00)	< 0.001

VAS: Visual Analogue Score

Table-III: Comparison of post-operative outcomes between study groups (n = 100)

Characteristic(s)		Suction Band Ligation Group (n = 50)	Forceps Band Ligation Group (n = 50)	p-value
24-hours post-operative pain VAS score	Median (IQR)	2.00(3.00 - 1.00)	4.00(5.00 - 2.00)	< 0.001
Leave from work by day 4	n (%)	2(4.00%)	4(8.00%)	0.552
Recurrence at 1 month	n (%)	0(0.00%)	0(0.00%)	--

VAS: Visual Analogue Scale

RESULTS

In this study, 100 patients (50 in each group) were included. Median age of the patients was 32.00 (65.00 - 18.00) years. There were 64(64.00%) male and 36(36.00%) female patients. Median body mass index (BMI) was 27.83 (46.00 - 21.13) kg/m². Comparison of these baseline characteristics between study groups is given below in Table-I:

Median intra-operative pain VAS score in Suction Band Ligation Group was 3.00 (5.00 - 2.00) while in Forceps Band Ligation Group, it was 6.00 (7.00 - 4.00), ($p < 0.001$), [Table-II]:

Median twenty four hours post-operative pain VAS in Suction Band Ligation Group was 2.00 (3.00 - 1.00) while in Forceps Band Ligation Group, it was 4.00(5.00 - 2.00), ($p < 0.001$). In Suction Band Ligation Group (n = 50), frequency of patients who were on leave from work by day 4 was 2(4.00%) while in Forceps Band Ligation Group (n = 50), it was 4 (8.00%), ($p = 0.552$). None of the patients in both groups had recurrence of hemorrhoids at one month follow up. This comparison of outcomes between study groups is given below in Table-III

Band Ligation is a superior technique compared to Forceps Band Ligation for the management of second-degree hemorrhoids, as it is associated with a significant reduction in both intra-operative and post-operative pain. Hemorrhoidectomy is a commonly performed surgical operation worldwide due to the high prevalence of hemorrhoids, which are a frequently encountered medical issue.¹² However, for less severe hemorrhoids, minimally invasive procedures like rubber band ligation is a much better and safer option as compared to invasive procedures.^{13,14} Present study focused on one of the less researched aspect of band ligation, which is the comparison of the outcome of suction versus forceps band ligation for the management of second degree hemorrhoids. To assess the severity of hemorrhoids, Goligher classification was used which is one of the most widely used and reliable tool to grade hemorrhoids, and has been used in a number of studies focusing on hemorrhoids.^{15,16}

In present study, average age of the patients suffering from hemorrhoids was thirty two years which corresponds to the statistics stated in a study by Hong *et al.* in which most patients who had hemorrhoids were found to have ages between thirty

to thirty nine years.¹⁷ In this study, most patients who had hemorrhoids were males which correlates with the finding of Kibret *et al.* that reported higher frequency of hemorrhoids in men as compared to women.¹⁸ Contrarily, Lee *et al.*¹⁹ and Oberi *et al.*²⁰ found higher frequency of hemorrhoids in females. No significant differences were seen between the study groups in terms of age ($p = 0.107$), gender ($p = 1.000$) and BMI ($p = 0.534$).

In present study, suction band ligation significantly reduced the intensity of pain during as well as twenty four hours after the surgery ($p < 0.001$). This association of the lower pain intensity with suction band ligation is similar to what was found by Kumar *et al.* who stated that most study participants who underwent suction band ligation had pain VAS ranging between 0-2.²¹ Similarly, Ramzisham *et al.*¹⁰ reported significantly lower intra-operative and twenty four hour post-operative pain after suction band ligation as compared to forceps band ligation ($p < 0.001$). In another study conducted by Beg *et al.*²², it was reported that both intra-operative ($p = 0.001$) and post-operative pain VAS scores ($p = 0.008$) were significantly lower inpatients who underwent suction band ligation as compared to those who had forceps band ligation. In terms of frequency of recurrence by one month, no significant difference was observed between groups.

Based on the results of present study, it is evident that suction band ligation is a significantly better option as compared to forceps band ligation for management of 2nd degree of hemorrhoids.

LIMITATION OF STUDY

The surgical procedure is operator dependent and depends on surgical skills of the surgeon. This limitation might have affected the outcome of the study. Moreover, sample size was small and study sample was confined to a single center and preoperative findings in each individual patient sometimes differ because of duration of the haemorrhoids. Finally, patients had limited follow up period. All these factors might have affected the outcome of the study.

CONCLUSION

In conclusion, Suction Band Ligation is a significantly better option as compared to Forceps Band Ligation for management of second degree of hemorrhoids as it significantly reduces intra-operative and post-operative pain.

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Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

RSS & SAA: Data acquisition, data analysis, critical review, approval of the final version to be published.

MA & HAM: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

UG & HS: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

REFERENCES

- Mazur-Bialy AI, Kołomańska-Bogucka D, Oplawski M, Tim S. Physiotherapy for prevention and treatment of fecal incontinence in women- systematic review of methods. *J Clin Med* 2020; 9(10): 3255. <https://doi.org/10.3390/jcm9103255>.
- Pata F, Sgró A, Ferrara F, Vigorita V, Gallo G, Pellino G. Anatomy, physiology and pathophysiology of haemorrhoids. *Rev Recent Clin Trials* 2021; 16(1): 75-80. <https://doi.org/10.2174/1574887115666200406115150>.
- Hawks MK, Svarverud JE. Acute lower gastrointestinal bleeding: evaluation and management. *Am Fam Physician*. 2020; 101(4): 206-212.
- Sadiqa A, Khan MSA, Akram I, Ben Rafiq MH, Zaman A, Khan TM. Risk factors of hemorrhoids in a tertiary care hospital of rawalpindi: a descriptive cross-sectional study. *Eur J Health Sci* 2022; 7(4): 41-47. <https://doi.org/10.47672/ejhs.1212>.
- Al-Masoudi RO, Shosho R, Alquhra D, Alzahrani M, Hemdi M, Alshareef L. Prevalence of hemorrhoids and the associated risk factors among the general adult population in Makkah, Saudi Arabia. *Cureus* 2024; 16(1): e51612. <https://doi.org/10.7759/cureus.51612>.
- Hwang SH. Trends in treatment for hemorrhoids, fistula, and anal fissure: go along the current trends. *J Anus Rectum Colon* 2022; 6(3): 150-158. <https://doi.org/10.23922/jarc.2022-012>.
- Salgueiro P, Ramos MI, Castro-Poças F, Libânio D. Office-based procedures in the management of hemorrhoidal disease: rubber band ligation versus sclerotherapy - systematic review and meta-analysis. *GE Port J Gastroenterol* 2022; 29(6): 409-419. <https://doi.org/10.1159/000522171>.
- Babar J, Ahmed M, Khan H, Samo KA. Comparison of effectiveness of injection sclerotherapy and rubber band ligation for second degree hemorrhoids. *J Surg Pak* 2022; 27(4): 128-132.
- Khan AR, Khan FK, Ul Hassan M, Naveed M. A cross sectional study on the outcome of rubber band ligation in third degree hemorrhoids. *Pak J Med Health Sci* 2021; 15(11): 3453-3454. <https://doi.org/10.53350/pjmhs2115113453>.
- Ramzisham AR, Sagap I, Nadeson S, Ali IM, Hasni MJ. Prospective randomized clinical trial on suction elastic band ligator versus forceps ligator in the treatment of haemorrhoids. *Asian J Surg* 2005; 28(4): 241-245. [https://doi.org/10.1016/S1015-9584\(09\)60353-5](https://doi.org/10.1016/S1015-9584(09)60353-5).
- Dekker L, Han-Geurts IJM, Grossi U, Gallo G, Veldkamp R. Is the Goligher classification a valid tool in clinical practice and research for hemorrhoidal disease? *Tech Coloproctol* 2022; 26(5): 387-392. <https://doi.org/10.1007/s10151-022-02591-3>.

Analysis of Suction Vs Forceps Band Ligation

12. Wang L, Ni J, Hou C, Wu D, Sun L, Jiang Q, Cai Z, Fan W. Time to change? Present and prospects of hemorrhoidal classification. *Front Med* 2023; 10: 1252468. <https://doi.org/10.3389/fmed.2023.1252468>.
 13. Abiodun AA, Alatise OI, Okereke CE, Adesunkanmi AK, Eletta EA, Gomna A. Comparative study of endoscopic band ligation versus injection sclerotherapy with 50% dextrose in water, in symptomatic internal hemorrhoids. *Niger Postgrad Med J* 2020; 27: 13-20. <https://doi.org/10.4103/npmj.npmj.128.19>.
 14. Dekker L, Han-Geurts IJM, Rørvik HD, van Dieren S, Bemelman WA. Rubber band ligation versus haemorrhoidectomy for the treatment of grade II-III haemorrhoids: a systematic review and meta-analysis of randomised controlled trials. *Tech Coloproctol* 2021; 25(6): 663-674. <https://doi.org/10.1007/s10151-021-02430-x>.
 15. Romano FM, Sciaudone G, Canonico S, Selvaggi F, Pellino G. Scoring system for haemorrhoidal disease. *Rev Recent Clin Trials* 2021; 16(1): 96-100. <https://doi.org/10.2174/1574887115666200319162033>.
 16. De Gregorio MA, Guirola JA, Serrano-Casorran C, Urbano J, Gutiérrez C, Gregorio A, et al. Catheter-directed hemorrhoidal embolization for rectal bleeding due to hemorrhoids (Goligher grade I-III): prospective outcomes from a Spanish hemorrhoid registry. *Eur Radiol* 2023; 33(12): 8754-8763. <https://doi.org/10.1007/s00330-023-09923-3>.
 17. Hong YS, Jung KU, Rampal S, Zhao D, Guallar E, Ryu S, et al. Risk factors for hemorrhoidal disease among healthy young and middle-aged Korean adults. *Sci Rep* 2022; 12(1): 129. <https://doi.org/10.1038/s41598-021-03838-z>.
 18. Kibret AA, Oumer M, Moges AM. Prevalence and associated factors of hemorrhoids among adult patients visiting the surgical outpatient department in the University of Gondar Comprehensive Specialized Hospital, Northwest Ethiopia. *PLoS One* 2021; 16(4): e0249736. <https://doi.org/10.1371/journal.pone.0249736>.
 19. Lee KY, Lee JI, Park YY, Kim YS, Lee DH, Chae HS, et al. Hemorrhoids are associated with urinary incontinence. *J Womens Health* 2020; 29(11): 1464-1468. <https://doi.org/10.1089/jwh.2019.8168>.
 20. Oberi IA, Omar Y, Alfaifi AJ, Ayoub RA, Ajeebi Y, Moafa SH, et al. Prevalence of hemorrhoids and their risk factors among the adult population in Jazan, Saudi Arabia. *Cureus* 2023; 15(9): e45919. <https://doi.org/10.7759/cureus.45919>.
 21. Kumar M, Roy V, Prasad S, Jaiswal P, Arun N, Gopal K. Outcomes of rubber band ligation in haemorrhoids among outdoor patients. *Cureus* 2022; 14(9): e29767. <https://doi.org/10.7759/cureus.29767>.
 22. Beg MA, Rahman S, Siddiqi F, Faridi S, Idrees I. Suction versus forceps band ligation – a comparative analysis. *Med Forum* 2017; 28(6): 121-124.
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